## REMARKS

This Amendment, submitted in response to the Office Action dated November 27, 2002, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

As a preliminary matter, the Examiner has withdrawn claims 13-18 from further consideration at this time. While the prior Response to Restriction Requirement elected claims 1-13, the Examiner deems claim 13 as part of the non-elected Group. Accordingly, Applicant has cancelled claims 13-18 from the present application.

As an additional preliminary matter, the specification has further been objected to for incorporating certain subject matter by reference to foreign patent documents. Applicant has amended the specification to include the subject matter of the incorporated documents. Applicant also attaches an executed Declaration to indicate that no new matter is being added by the modification. Applicant further submits that previously identified JP documents 6-184311; 6-27671; 6-43655; 6-95385; 6-202338; 6-56492 and 7-99435 are now identified by their corresponding U.S. Patent Nos. 5338818; 5422223; 5866306; 8385804; 5399462; 5238773; and 4481049, respectively.

Turning to the merits of the Office Action, claims 1-12 have been treated on the merits. Claims 1 and 8 have been rejected under 35 U.S.C. § 102 as being anticipated by Miyawaki (U.S.P. 4,799,750) and by Byer et al. (U.S.P. 6,013, 221, hereafter "Byer"). Claims 1, 2, 7 and 8 have been rejected under 35 U.S.C. § 103 as being unpatentable over Miyawaki or Byer further in view of Kanarian et al. (U.S.P. 5,131,068, hereafter "Kanarian"). Claims 1, 8 and 9 have been rejected under Section 103 as being unpatentable over Miyawaki, or Byer in view of Hosaka (JP

08179493). Claims 1, 2 and 7-9 have been rejected under Section 103 as being unpatentable over Miyawaki in view of Byer, Kanarian and Osaka. Claims 1, 8 and 10 have been rejected under Section 103 as being unpatentable over Miyawaki, Byer and DeFornel et al. (U.S.P. 5,384,464, hereafter "DeFornel"). Claims 1, 2, 7, 8 and 10 have been rejected under 35 U.S.C. § 103 as being unpatentable over Miyawaki or Byer in view of Thompson "Introduction to Microlithography" in view of Saigo et al. (U.S.P. 4,564,576, hereafter "Saigo"). Claims 1-8 are rejected under Section 103 as being unpatentable over Miyawaki in view of Byer in view of Kanarian, Thompson and Saigo. Claims 1-9 are rejected under Section 103 as being unpatentable over Miyawaki in view of Byer, Kanarian, Hosaka, Thompson, and Saigo. Claims 1-8 and 11 have been rejected under Section 103 as being unpatentable over Miyawaki or Byer in view of Kanarian, Thompson, Saigo and Harada. Claims 1-8 and 11-12 have been rejected under Section 103 as being unpatentable over Miyawaki or Byer in view of Kanarian, Thompson, Saigo, Harada, Taguchi (JP 04335620) and Yamanouchi et al. (U.S.P. 6,198,197, hereafter "Yamanouchi"). Applicant submits the following arguments in traversal of the prior art rejections.

Applicant's invention relates to an optical wavelength converting device that includes a periodic domain inversion structure. Applicant observed that conventional methods of domain inversion included periodic patterns that were not sufficiently and clearly demarcated between prongs of electrodes, for example, describing the periodic pattern. Applicant observed that for a period of domain reversals of 7 micrometers or less, a clear domain inversion pattern could be obtained for a duty ratio D of less than 0.15, where $D = A/\Lambda$, where A is the width of a line electrode and $\Lambda$ is a period of domain inversion regions. Once the periodic element is formed on

a unipolar ferromagnetic material using any one of a number of masking techniques, the domain reversals are imputed to the ferromagnetic material by application of an electric field by corona discharge.

Turning to the cited art, Applicant notes that the majority of the references do not even pertain to formation of domain reversals as described by the claims of the present invention. For example, one of the base references, Miyawaki relates to forming ion-exchange regions by immersing a substrate in a benzoic acid bath. Col. 3, line 65 to col. 4, line 11. This bears no relationship to the formation of domain reversals as described in each of the pending independent claims. To the extent that any domain reversals may be formed by the ion-exchange, Applicant would note that such domains are formed by immersion into an acid, rather than by application of an electric field as described by the pending claims.

In similar regard, Kanarian describes formation of optical waveguides from different materials to maintain a constant waveguide thickness; DeFornel, Thompson and Hosaka each only relate to formation of a resist pattern or other form of microlithography, Saigo relates to formulations for a resist material, and Yamanouchi relates to a device for propagating a surface wave.

Only three of the references bear any relationship to the method of forming domain reversals. Byer is primarily directed towards forming a pattern of conducting strips interspersed with an insulator to control the fringing of the electric field. Because the reference is concerned with the application of an electric field after the formation of the resist pattern, Byer provides little detail on the formation of the resist pattern using a mask.

Harada relates to improved domain reversals by using a ferromagnetic material having a prescribed MgO concentration.

Taguchi relates to a polarization inversion structure, which the Examiner purports to include an electrode period of 2-10 microns and an electrode line with of 0.5-15 microns. Taguchi teaches electrode widths of at least 0.5 microns. However, it is well known in the art that if is very difficult to produce a short-period such as 2 to 3 microns of periodic domain inversion with an electrode width of 0.5 microns. Further, it is well known in the art that it is difficult to produce a short-period such as 2 to 3 microns of periodic domain inversion with lithium niobate doped with MgO. The use of the near field light according to the present invention makes is possible to achieve electrode widths of 0.5 microns or less, whereby the periodic domain inversion having a short-period can be easily produced. Taguchi does not teach or suggest the use of the near field light.

The Examiner maintains that Miyawaki teaches each feature of independent claim 1. However, as discussed above, the pending claims each describe formation of domain reversals, a feature on which Miyawaki is completely silent. Accordingly, claim 1 is not anticipated by Miyawaki and is similarly not rendered obvious over Miyawaki over any combination of cited art. The Examiner further relies on col. 14, line 19 to col. 15, line 3 of Miyawaki to teach exposure to near field light. However, as the Examiner recognizes, Miyawaki merely teaches a form of contact exposure, whereby the mask and resist are placed in close proximity. The Examiner's own cited reference suggests that resists can be exposed by other forms of irradiation as an alternative to the near field light described in claim 1. See Saigo, col. 1, lines 7-15. Therefore, claim 1 is not explicitly or inherently anticipated by Miyawaki.

The Examiner also maintains that Byer also teaches each feature of claim 1. However, as discussed above, Byer is more concerned with formation of electrodes and application of an electric field through intervening insulators between prongs of the electrodes. This is performed after patterning of the resist which are used to form the electrodes. For this reason, the discussion of resist formation is cursory and also does not describe the near field light exposure as described by claim 1.

To the extent that any of the references describe irradiation of light in the near field region that is not taught in Byer, the references may not be combined with Byer as they are not drawn towards periodic domain reversal formation. In addition, it appears that certain references also teach away from use of a ferroelectric material. At col. 1, lines 40-46 of Kanarian, the reference suggests that a $LiNbO_3$ is an inferior waveguide material due to low value of second order susceptibility. Therefore, the reference teaches away from the type of material described by each of the independent claims in favor of an organic polymer. This obviates each rejection made over the combination of Miyawaki or Byer and Kanarian (Detailed Action, paragraphs 6, 8, 10, 12, 14-16). Therefore, all the pending claims patentable.

Applicant further submits that Byer cannot be combined with either Hosaka or DeFornel. As the Examiner points out, Byer specifically cautions against the reflection of a masking device to maintain pattern fidelity. To achieve this, contact masking is taught. By contrast, Hosaka specifically relies on reflections rather than avoidance thereof for patterning purposes. Hosaka teaches a space S between a light sensitive film and a conductor 5 which includes a hole pattern. The spacing separation of Hosaka is inconsistent with the contact alignment of Byer. Similarly, DeFornel specifically contemplates not using a contact mechanism for patterning purposes.

While the Examiner contends that the various patterning techniques of Hosaka and DeFornel can be used to increase resolution, the primary Byer reference specifically teaches away from the spacing required by the secondary references. In similar regard, Miyawaki teaches the use of contact exposure and also may not be combined with Hosaka or DeFornel for the reasons set forth above. This obviates each ground of rejection made over the combination of Byer or Miyawaki in view of Hosaka or DeFornel. Detailed Action, paragraphs 7, 8, 9, 10, 13, 14). Therefore, all the pending claims patentable.

With further regard to the rejections of claim 9 including the Hosaka reference, the Examiner relies on Hosaka to teach an optical stamp described in these claims. However, claim 9 describes a light transmitting member having a concavity-convexity pattern formed on one surface. In Hosaka, the prism 3 has multiple flat surfaces but none with either a concave or convex pattern. The Examiner has apparently ignored this aspect of the claims. The rejection is not supported for this additional reason. (Detailed Action, paragraphs 7, 8 and 13).

With further regard to the rejections of claim 10 including the DeFornel reference, the Examiner appears to rely on DeFornel for teaching the use of a probe. However, claim 10 describes the probe with an opening having a diameter shorter than a wavelength of the exposure light. In DeFornel, the probe comprises a waveguide such as an optical fiber. To the extent that the fiber has an opening, the diameter of the opening relative to the exposure light is never discussed. The various wavelengths that may be propagated in the fiber bear no relation to the diameter of the opening of the probe. The Examiner has also failed to indicate where this feature is described. Therefore, claim 10 is also patentable over any combination including DeFornel for this additional reason. (Detailed Action, paragraphs 9, 10 and 14).

With regard to combinations over Miyawaki, Applicant emphasizes that Miyawaki does not teach the formation of domain reversals by applying an electric field, and the majority of the secondary references do not make up for the above deficiency. In particular, DeFornel, Thompson, Hosaka, Saigo and Yamanouchi do not discuss periodic domain reversals, and their combination with Miyawaki does not teach each feature of the independent claims. This obviates each ground of rejection made over the combination of Miyawaki in view of the above secondary references. (Detailed Action, paragraphs 6, 7, 8, 9, 10, 11, 12, 13, 14).

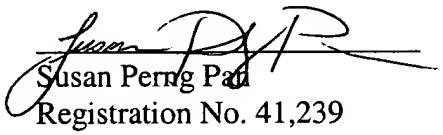
With regard to the rejections over Miyawaki and Harada or Taguchi, the secondary references do not specifically teach the near field described by the independent claims. (Detailed Action, paragraphs 15, 16). Therefore, all the pending claims patentable.

Applicant has added claims 19-21 to describe features of the invention more particularly.

In view of the above, Applicant submits that claims 1-12 and 19-21 are in condition for allowance. Therefore it is respectfully requested that the subject application be passed to issue at the earliest possible time. The Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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## APPENDIX

## VERSION WITH MARKINGS TO SHOW CHANGES MADE

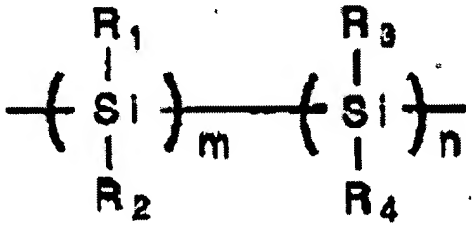
**IN THE SPECIFICATION:**

**The specification is changed as follows:**

**Page 35, delete last paragraph, continuing on to page 36.**

Examples of the resist materials, which may be employed for the second resist layer 32, include the resist materials described in ~~Japanese Patent Nos. 2035509, 2094657, 2597163, 2606652, 2646241, 2646288, and 2646289; Japanese Unexamined Patent Publication Nos. 60(1985 ) 191245, 62(1987) 247350, 62(1987) 36661, 62(1987) 36662, 62(1987) 38452, 62(1987) 96526, 62(1987) 136638, 62(1987) 153853, 62(1987) 159141, 62(1987) 220949, 62(1987) 229136, 62(1987) 240954, 63(1988) 91654, 63(1988) 195649, 63(1988) 195650, 63(1988) 218948, 63(1988) 220241, 63(1988) 220242, 63(1988) 241542, 63(1988) 239440, 63(1988) 313149, 1(1989) 44933, 1(1989) 46746, 1(1989) 46747, 1(1989) 76046, 1(1989) 106042, 1(1989) 102550, 1(1989) 142720, 1(1989) 201653, 1(1989) 222254, 1(1989) 283555, 2(1990) 29652, 2(1990) 3054, 2(1990) 99954, 3(1991) 100553, 4(1992) 36754, 4(1992) 36755, 4(1992) 104252, 4(1992) 106549, 4(1992) 107460, 4(1992) 5 107562, 4(1992) 130324, 4(1992) 245248, 6(1994) 27670, 6(1994) 118651, 6(1994) 184311, 6(1994) 27671, 6(1994) 35199, 6(1994) 43655, 6(1994) 95385, 6(1994) 202338, 6(1994) 342209, 7(1995) 114188, 8(1996) 29987, 8(1996) 160620, 8(1996) 160621, 8(1996) 160623, 8(1996) 193167, and 10(1998) 319594; Japanese Patent Publication Nos. 6(1994) 7259, 6(1994) 42075, 6(1994) 56492, 6(1994) 79160, 6(1994) 84432, 7(1995) 27211, 7(1995) 60266, 7(1995) 69610, 7(1995) 99435, 7(1995) 111582, and 7(1995) 113772; U.S. Patent Nos. 4689289 and 4822716; EP No.~~

~~229629A1; and Japanese Patent Application Nos. 10(1998) 354878, 11(1999) 31591 and 11(1999) 20224.~~ U.S. Patent Nos. 5338818, 5422223, 5866306, 5385804, 5399462, 5238773, 4481049, 4689289 and 4822716; and EP No. 229629A1. Further, the resist materials shown in the following formula, which are disclosed in Japanese Unexamined Patent Publication No. 7(1995)-114188, can be employed for the second resist layer 32.



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The photosensitive resin composition contains polysilane having a structure represented by the formula ( in which each of R1-R4 is independently selected from the group consisting of optionally substituted aliphatic, alicyclic and aromatic hydrocarbon groups, and each of m and n is an integer), an optical radical generating agent and an oxidizing agent.

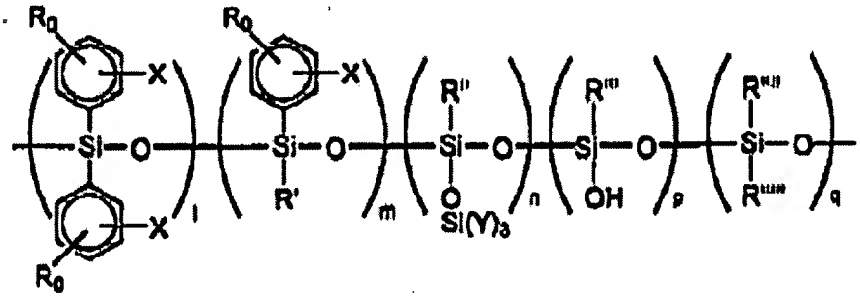
Further, the resist materials shown in the following formulae, which are disclosed in Japanese Unexamined Patent Publication No. 2002-20224, can be employed for the second resist layer 32.

The positive-type silicone-containing photosensitive composition comprising:

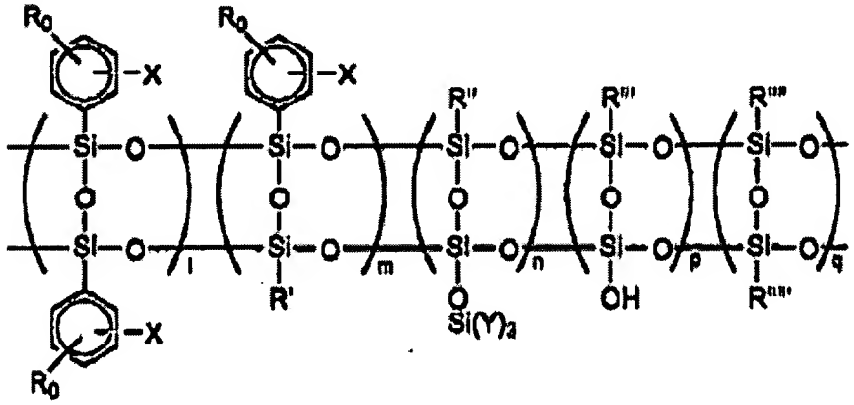
(a) a polymer which has a repeat unit expressed with the following general formula (I) and/or (II),and which is water-insoluble and alkali-soluble;

(b) a compound which generates an acid when subject to an activity beam of light or radiation; and

(c) a polymer which has in the side chain thereof a repeat unit expressed with the following general formula (III), the general formula (IV), or the general formula (V), and which exhibits properties that the solubility in an alkali developer increases due to the action of an acid.



Formula I



Formula II

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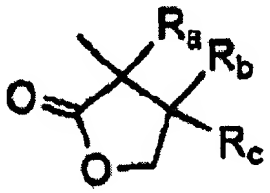
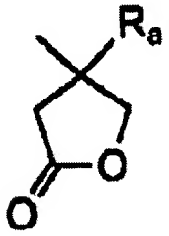
(X in formulae (I) and (II) is a group selected from the group consisting of –C(=O)-R group, -CH(OH)-R group, and a carboxyl group, and a plurality of X groups in the formula may be the same or different. R shows a hydrocarbon group which may have a hydrogen atom or a substitute therein. R'-R''''' may be the same or different, and is selected from the group consisting of an alkyl group, a cycloalkyl machine, an alkoxy group, an alkenyl group, an aralkyl

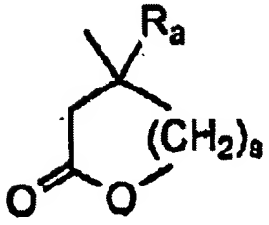
group and a phenyl group all of which may have a hydroxyl group and/or a substituent. Y is an alkyl group, an alkoxy group or a siloxyl machine. R0 represents a group selected from the group consisting of an aliphatic hydrocarbon group and an aromatic hydrocarbon group which may have a hydrogen atom, a halogen atom and/or a substituent. Each of l, m, n and q is 0 or a positive integer, and p is a positive integer.)




Formula III




Formula IV




Formula V

(Each of Ra, Rb and Rc in formulae (III) – (V) is independently a hydrocarbon group which may have a hydrogen atom and/or a substituent. s is an integer equal to 2 or greater.)

**IN THE CLAIMS:**

**Cancel claims 13-18.**

**New claims 19-21 are added.**